Welcome to CSE 521

Administrivia

- **Anna Karlin**
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  - Office hours, by appointment

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  - Office hours: Monday, 3-3:45pm CSE 218, Wednesday, 3-3:45pm, CSE 220

- **Course web page:**
  - http://courses.cs.washington.edu/521

What is this course about?

- **Algorithms in the modern era**
  - approximation, randomization
  - Different models for how input is received and constraints on algorithms: online, streaming, high-dimensional

- **Goal:** expose you to a sampling of ideas, techniques, tools and applications.

Tentative list of topics

- **Hashing and related topics**
  - Universal hashing, perfect hashing, load balancing, min-hashing, locality sensitive hashing, and applications to streaming

- **Linear programming**
  - Duality + applications, then bit of convex optimization

- **Online learning**
  - Multiplicative weight updates, applications and extensions

- **Dealing with high-dimensional data**
  - Dimensionality reduction, low rank approximation, etc.

- **Sampling of other topics**
  - ??

Goals

- To introduce you to some of the fundamental ideas that have become important in algorithms in the last 20 years.

- To show you how much fun, beautiful and clever the myriad of ideas in this space are.

- To convince you that no matter what area you end up working in, knowing more about algorithms and theory will serve you well.

- To help you develop a toolkit that is crucial no matter what you end up doing.

Background expected

- Discrete math at level of CSE 311
- Introductory probability at the level of CSE 312:
  - Probability space, random variables, basic distributions, independence, conditional probability, expectation, tail bounds
- Intro algorithms and data structures (e.g., CSE 332)
- “Mathematical maturity”
Workload

• 5-6 problem sets (60%)
• Project (40%)
  – Must work in pairs.
  – One-page preproposal due by April 28
  – Final (10 page) paper due on June 1.
  – Will be posted to class discussion page.
  – You will be commenting on each others papers
  – Each group will give a short presentation as well.

Other

• No book, but I’ll post lots of references.
• No class April 9!

• Questions?